

WE CLAIM:

1. A method of 3D measurement, evaluation and grading
5 system for fabric/textile structure/garment appearance,
the method comprising using a fixed digital camera
positioned above a piece of the fabric, shining at least
two different parallel light beams from inclined
10 directions on to the surface and capturing different
reflected images of the surface with the camera,
analysing the captured images to derive values of
parameters of the surface based on the intensities of
light reflected from a number of evenly distributed
points of the surface.

15 2. A method of 3D measurement, evaluation and grading
system for fabric/textile structure/garment appearance
according to claim 1, including using four different
parallel light beams.

20 3. Apparatus for 3D measurement, evaluation and
grading system for fabric/textile structure/garment
appearance, the apparatus including a digital camera
arranged to be mounted above a piece of fabric, means to
25 shine at least two inclined different parallel beams
onto a surface of the fabric below the camera, means for
analysing images of the fabric captured by the camera,
and a computer programmed to derive values of P and Q
from the captured images, where P and Q are summations

of surface gradients for a plurality of evenly distributed points in an x direction and in a y direction respectively.

5 4. A method of grading fabric/textile structure appearance based on values P and Q, the method comprises using a fixed digital camera positioned above a piece of the fabric, shining at least two different parallel light beams from inclined directions on to the surface and capturing different reflected images of the surface
10 with the camera, analysing the captured images to derive values of P and Q, where P and Q are summations of surface gradients for a plurality of evenly distributed points in an x direction and in a y direction respectively, and calibrating $P + Q$ against a subjective
15 grade analysis of the fabric, and thereafter using calibrated P and Q to determine the grades of fabric.

20 5. A method of grading fabric/textile structure appearance according to claim 4, including using four different parallel light beams.

25 6. A method of grading fabric/textile structure appearance according to claim 4, in which the surface gradients p and q are derived using equations (7).

7. Apparatus for 3D measurement, evaluation and grading system for fabric/textile structure/garment

appearance including a digital camera arranged to be
mounted above a piece of fabric, means to separately
shine at least two inclined different parallel beams
onto a surface of the fabric below the camera, means for
5 analysing separate images of the fabric captured by the
camera for each light beam respectively, and a computer
programmed to derive values of parameters of the surface
based on the intensities of light reflected from a
number of evenly distributed points of the surface.

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8. Apparatus for 3D measurement, evaluation and
grading system for fabric/textile structure/garment
appearance according to claim 8, including means for
separately shining four inclined different parallel
15 light beams evenly distributed with respect to the
camera.